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ABSTRACT

This study brings together a large body of literature on indicators of changes in U.S. scholastic aptitude and achievement levels within the 1944-1980 period. The population target is youth from preschool to post-college graduate ages. The study is divided into three major sections: (1) a discussion of the trends which have emerged over time that have been supported by creditable data. The discussion approaches the subject by first reviewing aptitude test score patterns from 1952 through 1980 on eight scholastic aptitude and admission tests. Examinees for these tests predominantly ranged from 11th grade through graduate levels. Second, an analysis is done on the scholastic achievement test score data covering 10 different test batteries for grades 1 through 12. Finally, section one of the paper concludes with a brief overview of other indicators of significant, though less quantifiable changes in the target population during the period; (2) an annotated bibliography of 49 sources which were reviewed by the author, including 34 citations which have been quoted directly from other sources; and (3) a relatively complete bibliography of literature related to the decline of test scores. This reference list includes over 240 sources. (Author/GK)

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THE TEST SCORE DECLINE:

A Review
and
Annotated Bibliography

Brian K. Waters

Human Resources Research Organization

U.S. DEPARTMENT OF EDUCATION
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PREFACE

The Department of Defense (DoD), in conjunction with the Department of Labor, is sponsoring research to determine the aptitude profile of the current youth population. To accomplish the project, DoD contracted with the National Opinion Research Center (NORC) of the University of Chicago to administer its enlistment test, the Armed Services Vocational Aptitude Battery (ASVAB), to a representative sample of youth. That sample was already under study in the National Longitudinal Survey of Youth Labor Force Behavior that NORC has been conducting over the last two years for the Department of Labor.

DoD also commissioned other studies on relevant topics which were designed to provide backup materials for the analyses of the aptitude profile data. This review of civilian aptitude and achievement test score decline over the past 20 years is intended to place military test score trends over the survey period into better perspective.

The publication of this report as a technical memorandum provides access to this work by the wider audience of the psychological/educational research community beyond the Department of Defense.

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INTRODUCTION[1]

BACKGROUND

Beginning in 1975, the College Entrance Examination Board (CEEB) published several reports detailing consistently declining Scholastic Aptitude Test (SAT) scores over a near ten-year period. When the CEEB data were supported by American College Testing Program (ACT) data as well as an ever-growing number of achievement test score declines, educational and political forces swung into action. Over the next three years, the subject of declining student aptitudes and achievement dominated the educational and psychological literature, with many reports and books receiving heavy media and public exposure. Numerous symposia, commissions, and studies were launched to answer three key questions: 1) Were the declines a "real" national phenomonen?; 2) Could the cause(s) for the declines be identified if the answer to 1) was yes?; and 3) What could be done about the decline?

STUDY OUTLINE

This paper is intended to bring together this large body of literature on indicators of changes in U.S. scholastic aptitude and achievement levels within the 1944-1980 period. The population target is youth from pre-school to post-college graduate ages.

The study is divided into three major sections:

1) A discussion of the trends which have emerged over time that have been supported by creditable data. The discussion approaches the subject by first reviewing aptitude test score patterns from 1952 through 1980 on eight scholastic aptitude and admission tests. Examinees for these tests predominantly ranged from 11th grade through graduate levels. Second, an analysis is done on the scholastic achievement test score data covering 10 different test batteries for grades 1 through 12. Finally, section one of the paper concludes with a brief overview of other indicators of significant, though less quantifiable changes in the target population during the period.[2]

2) An annotated bibliography of 49 sources which were reviewed by the author, including 34 citations which have been quoted directly from other sources.

3) A relatively complete bibliography of literature related to the decline of test scores. This reference list includes over 240 sources.

[1] The author wishes to thank research assistants Saundra Waters and Marsha Wallace for invaluable aid on this study.

[2] This study does not delve into the possible causes underlying the decline in scores, except tangentially through bibliographic reference to other sources which have dealt with the numerous hypotheses.

Section I

EVIDENCE OF A DECLINE

SECTION I: EVIDENCE OF A DECLINE

SCHOLASTIC APTITUDE MEASURES

The most clear, consistent and unambiguous evidence of the decline in the target population evolved in the aptitude testing domain. Table 1 and Figure 1 provide a compilation of the trends in this country since early in the 1950s; these data are remarkably consistent. With the two exceptions of the Law School Admissions Test and the Natural Science Subtest of the ACT, all of the data show about 1 to 3% of a standard deviation decline per year since the mid 1960s. Other major trends show that verbal scores have tended to decrease faster than quantitative scores; that female scores have declined more rapidly than male scores, particularly in the verbal domain; and that overall aptitude test scores increased from 1944 through about 1965 and decreased consistently through the late 1970s. The source numbers shown in Table 1 refer to the number of the data sources in the section 3 bibliography from which trends have been calculated. Discussion of the individual measures of scholastic aptitude follows.[1]

Scholastic Aptitude Test (SAT)

The SAT was introduced 55 years ago, with the 1941 examinees becoming the standardization population for tests since (110). Test performance remained relatively consistent through the 1940s, followed by a steady increase on both verbal and mathematics scales through 1964. Since 1965, however, mean scores on both subtests have declined continuously to their lowest point in history in 1980 (199). Two particularly rapid periods of decline occurred; 1965-1967 and 1973-1975, with the verbal score declines sharper than the mathematics score slippage (103). The recent period, 1977-1980, shows a slowing of the rate of decline with about 1-2 points per year loss on each subscale with the 1980 SAT-total scores at 466 mathematics and 424 verbal. The 1967-1980 SAT score decline for high and low scores is displayed in Figure 2.

Analysis of the SAT changes reflects no apparent geographical, test content, scale drift, socio-economic status, or racial-ethnic trends which appear to contribute substantially to the SAT score decline (103). There is evidence that the population of SAT test takers has become younger, more proportionally female, and more apt to be college-bound than earlier year examinees (103). The variances of the two subtests have remained very constant since the decline began, with verbal standard deviations between 1966-1980 ranging from 107 to 110 and mathematics from 110 to 117 (103). Thus, the expansion of the test taking population to a greater percentage of high school seniors has not reflected a significantly wider spread of test scores.

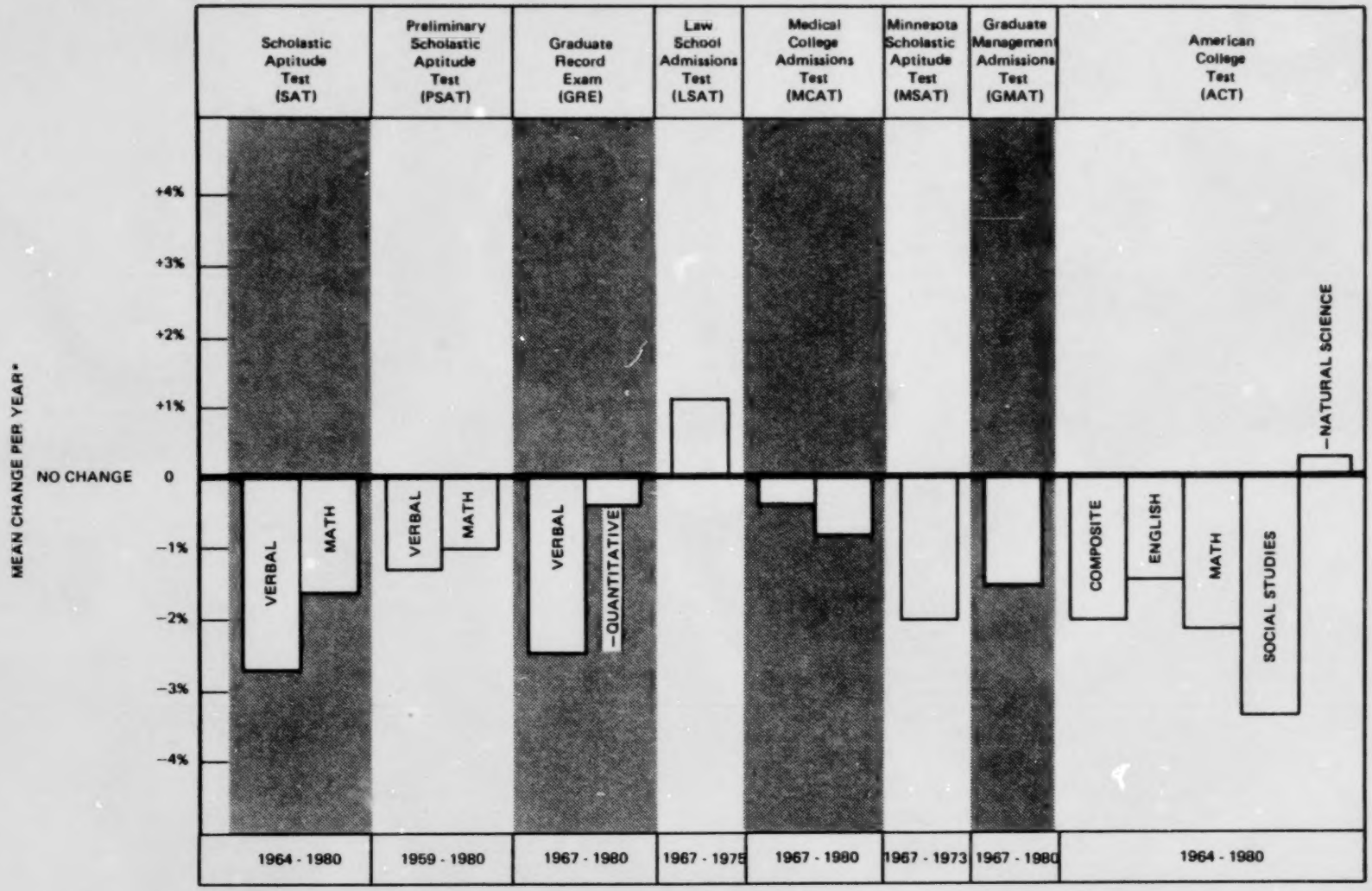
[1] Much of the discussion in this section reflects a synopsis of two sources: Harnischfeger & Wiley (#103), Hess, Martin, Parker, & Beck (#157). In the author's opinion, these are the "best", i.e., most comprehensive and objective, analyses of the declining test scores.

Table 1

Scholastic Aptitude Measures

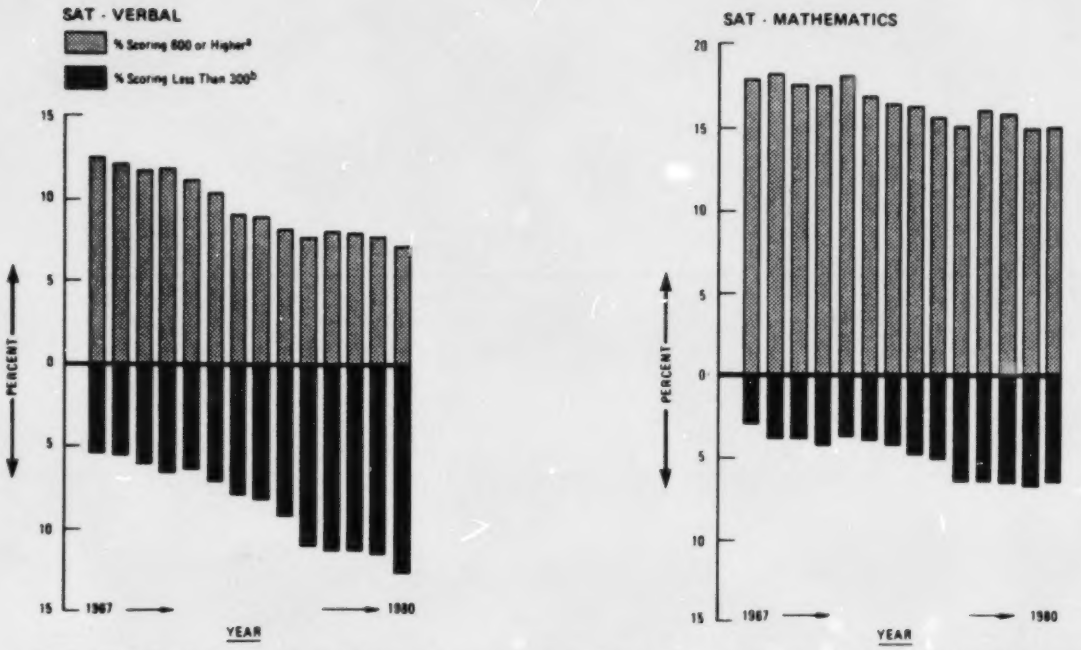
Instruments		Time-Periods	Grade(s)	Annual N	Areas	Trends % SD/YR	Bibliography Source Numbers
Scholastic Aptitude Test (SAT)	Verbal	1967-1980	11/12	1,500,000	NE, E, EC	Male -2.3	48, 4, 42
		1967-1980				Female -3.2	103, 199
		1952-1963				Total +0.2	
		1964-1980				Total -2.7	
	Mathematics	1967-1980	11/12	1,500,000	NE, E, EC	Male -1.4	48, 4, 42,
		1967-1980				Female -1.6	103, 199
		1952-1963				Total +0.6	
		1964-1980				Total -1.6	
American College Test (ACT)	Composite	1964-1980	11/12	850,000	NC, S, W	Male -1.3	103, 173
						Female -2.5	
						Total -2.0	
	English	1964-1980	11/12	850,000	NC, S, W	Male -0.9	103, 173
						Female -2.3	
						Total -1.4	
	Mathematics	1964-1980	11/12	850,000	NC, S, W	Male -2.3	103, 173
						Female -2.0	
						Total -2.3	
	Social Studies	1964-1980	11/12	850,000	NC, S, W	Male -2.4	103, 173
						Female -4.1	
						Total -3.3	
	Natural Science	1964-1980	11/12	850,000	NC, S, W	Male +0.9	103, 173
						Female -0	
						Total +0.3	
Preliminary Scholastic Aptitude Test[1] (PSAT)	Verbal	1959-1980	11	1,000,000	NE, E, EC	Male -0.7	44, 103
						Female -1.8	
						Total - 1.3	
	Mathematics	1959-1980	11	1,000,000	NE, E, EC	Male -1.1	44, 103
						Female -0.8	
						Total -1.0	
Minnesota Scholastic Aptitude Test[2] (MSAT)	Form A	1958-1966	11	60,000	Minn.	Total +6.2	156, 225, 226
	Form C	1967-1973	11	65,000	Minn.	Total -2.0	
Graduate Record Exam (GRE)	Verbal	1967-1980	16	800,000	National	Total -1.3	48, 248
	Quantitative	1967-1980	16	Not Available	National	Total -0.4	48, 248
Law School Admissions Test (LSAT)		1967-1975	16	Not Available	National	Total +0.6	114
Medical College Admissions Test (MCAT)	Verbal	1967-1975	16	55,000	National	Total -1.8	114, 17
		1977-1980				Total -2.6	
	Quantitative	1967-1975	16	55,000	National	Total +1.0	114, 17
		1977-1980				Total -4.3	
Graduate Management Admissions Test (GMAT)		1967-1975	16	400,000	National	Total -1.5	96, 65

[1] PSAT Scores corrected for scale drift, 1967-1980.
[2] MSAT Calculations split in 1966-1967 when current form was introduced. No MSAT after 1973.



*Mean proportion of a standard deviation per year.

Figure 1 — **Aptitude Measures**



[a]Scores of 600 on the SAT - VERBAL and the SAT - MATH equate approximately to scores in the 90th percentile and 92nd percentile, respectively, on the AFQT distrubution

[b]Scores of 300 on the SAT - VERBAL and the SAT - MATH equate approximately to scores in the 31st percentile and 50th percentile, respectively, on the AFQT distribution

SOURCES: College Entrance Examination Board.

Figure 2 — **Proportions of College Aspirants Scoring 600 or Higher and Less than 300 on the Scholastic Aptitude Test (SAT), 1967 - 1980**

Preliminary Scholastic Aptitude Test (PSAT)

The PSAT is a shortened version of previous SAT forms given to high school juniors in October of each year. Since 1971, the test has been connected to the National Merit Scholarship Competition (NMSC). The PSAT/NMSC population tends to be stronger than the SAT population and has been even more so since the 1971 change. College Entrance Examination Board analysis indicated a significant scale drift after 1966. Thus, Table 1 data on the PSAT and discussion in this section reflect corrected results from the ETS studies (103). PSAT verbal and mathematics trends from 1959 to 1980 show relatively irregular patterns with an average overall decline of about 1 to 2% of a standard deviation per year. When viewed by sex within the two subtests, however, the trends are quite different. Males on the verbal scale and females on the mathematics test have shown only a gradual decrease of less than 1% per year over the period. On the other hand, females lost an average of nearly 2% of a standard deviation per year on the verbal scale, while males declined an average of 1% of a standard deviation per year on the mathematics (103). These two subgroups thus accounted for virtually all of the PSAT declines over the 15 year period. The reasons underlying these changes are not clear, although the variances of the mathematics scores are sharply higher for both males and females over the period

while the verbal score variances are relatively level (103). These results would suggest that the PSAT later populations were more heterogeneous in mathematical aptitudes, but not verbal aptitudes. As this significant subtest X sex interaction effect did not evolve as strongly in any of the other aptitude measures, the author concludes that it likely is a result of unspecified characteristics of the PSAT examinee pool.

American College Testing Program (ACT)

The ACT consists of a battery of four college admissions tests: English, Mathematics, Social Studies, and Natural Sciences. The battery is directly based upon the Iowa Tests of Educational Development (ITED). Thus, the test might be considered more achievement oriented than the SAT/PSAT just discussed (103). The ACT also yields a composite score which is an average of the four subtest scores. ACT composite score trends over the 1964-1980 period are basically very similar to the combined SAT verbal/mathematics trends during the same time frame. On a per year basis, the average ACT composite decline has been about 2% of a standard deviation (157), with about double the decline in female mean scores as compared with male scores (102) over the period. Within the four subtests, female declines have been greater in the English and Social Studies tests, while the males have been greater on the Social Studies, Mathematics tests. Relatively little change occurred on the natural sciences subtest, although males tended to improve slightly over the period and females remained practically unchanged over the 17 year timeframe. Munday, in a comprehensive analysis of ACT score decline, concluded that examinee grade level and geographical region variables did not account for score declines. However, he pointed out that the increasing proportion of females taking the test (45% in 1965 vs. 52% in 1974) and increasing variances of scores on all subtests were likely correlates with the declining trends (157).

Minnesota Scholastic Aptitude Test (MSAT)

Over 90% of Minnesota juniors took the MSAT, a test given from 1958 through 1973. A form change occurred in 1966-67, thus data in Table 1 reflect both pre and post change trends. In general, means and standard deviations increased from 1958 through 1966 and both steadily decreased until 1973 (103). No breakout by sex was available for this study, although the 2% standard deviation per year decline in the later period was similar to SAT and ACT overall results.

Graduate Record Examination (GRE)

The GRE is the most popular of the graduate admission tests. It was developed by Educational Testing Service and yields both verbal and quantitative scores. The average verbal and quantitative declines from 1967-1980 were about 1% of a standard deviation . . . similar to SAT, PSAT, MSAT and ACT rates. Again, no sex by subtest data were available for the GRE (95).

The Graduate Management Admissions Test (GMAT)

GMAT test results are used for selection to graduate schools of business. The 1967-1975 trend showed an average of 1 1/2% of a standard deviation per year decline over the eight year period (95).

Medical College Admissions Test (MCAT)

MCAT results over the 1967-80 time period reflect similar trends for verbal and quantitative subtests. The verbal test mean decreased an average drop of about 2% of a standard deviation per year. However, the MCAT quantitative mean fell less than 1% per year over the period (95).

Law School Admissions Test (LSAT)

Like the MCAT-Q, the LSAT mean score increased over the 1967-1975 period, an average of 0.6% of a standard deviation per year (95).

Stanford-Binet

Arguments over the classification of tests between aptitude and intelligence (IQ) rage within the literature, and it is not the purpose of this paper to enter this fray. The Stanford-Binet, an "IQ" test, is an individually administered, highly reliable measure which has been administered nationally since early in this century. Thorndike reviewed Stanford-Binet trends over a 70 year period (in 103, page 4).[1] He presented data to show that preschoolers of 1972 averaged 10 points higher than their age-mates of the 1930s; that high schoolers averaged 6 points higher; and that 4th graders averaged 3 points higher. He also showed an average 3 point drop for preschoolers between 1972 and 1975. This one source was the only reference located for this paper which analyzed IQ test score trends over time. A much more complete review in this area should be done. One remarkable source for this further examination would be Shuey's *The Testing of Negro Intelligence, Second Edition*, which was published in 1966. This extraordinary book provides data from over 600 studies of IQ and aptitude over a period of over 50 years. The effort of combining Shuey's extensive tables into a comprehensible analysis over time was beyond the scope of this paper, but the effort should be made. It is difficult for the author to understand why the extensive analysis of the declining test scores which occurred in the 1975-1978 time frame virtually ignored the individually and group administered IQ test score trends. Although the precise relationship between what IQ tests measure as compared with what aptitude and achievement tests measure is unclear, the trends from the former should prove useful in the analysis of the latter.

SUMMARY OF APTITUDE TESTING TRENDS

The aptitude testing data covering the entire period from the early 1960s to 1980 show remarkable consistency. With the exception of slight increases on the MCAT-Q and LSAT, the other measures of scholastic aptitude of youth reviewed have consistently decreased at a rate of about 1 to 3% of a standard deviation per year. This trend continues today, although there is some evidence that the rate of decline has lessened

[1] Thorndike, R.L. Mr. Binet's Test 70 Years Later. *Educational Researcher*, 4, 1975, 3-7.

somewhat in the past three years. And, although the declines are clearly related, to some degree, to a changing population of test takers, particularly women, the pattern has remained fairly consistent over breakouts by race-ethnic group; geographical areas; age beyond about 10 years old; content area; and socio-economic status. Thus, the "causes" of the consistent aptitude test score patterns are not at all clear. The general conclusion of most authors on the subject is that there is little doubt that there are multiple factors which have led to the trend.

SCHOLASTIC ACHIEVEMENT MEASURES

Table 2 and Figure 3 depict 1964-1980 mean results for 10 achievement test batteries. Data for the individual batteries have been grouped, when available, into grades 1-4, 5-8, and 9-12 and by subtests that roughly parallel the verbal/quantitative/composite breakouts of the aptitude measures. As might be expected, long-term trends across achievement content areas are not as consistent as across the more "factorially pure" aptitude areas. Within Table 2, trend data are displayed by percent change in standard deviation per year where both means and variances were provided in the original source.

Stanford-Achievement Test

For the 1964 to 1973 period, Copperman (48) reported that mean Stanford-Achievement Test scores in reading and mathematics computation decreased consistently the older the test group from grades 1 to 8. He reported that Metropolitan Readiness Tests indicated that 1978 preschool children far exceeded mid-1960's preschool children academically and that the early scholastic improvement held through 2nd grade. Thereafter, diminishing performance at an increasing rate evolved to the point wherein

> . . . eighth grade students in 1973 read about as well as seventh graders in 1964, and compute about as well as sixth graders at that time. (48)

The overall rate of achievement loss was approximately twice as fast for math computation as for reading on the average.

Metropolitan Achievement Test (MAT)

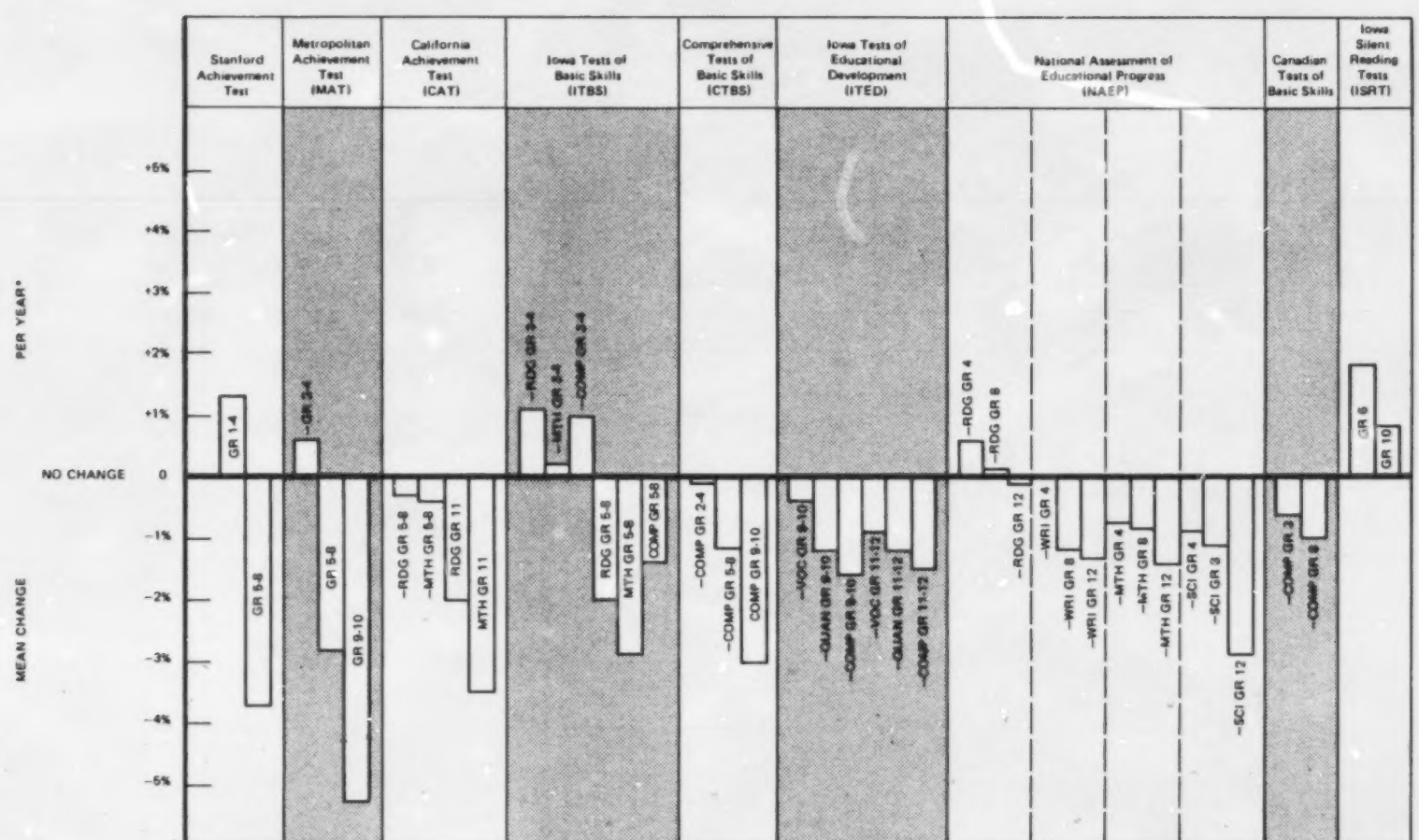
A renorming study which looked at MAT score changes between 1970 and 1978 showed a similar pattern for children from 2nd through 10th grades. Student achievement increased in the first 3 years, and dropped sharply from 5th through 10th grades. The pattern on the MAT was consistent across 5 subtests, reading, language, math, science, and social studies, with the greatest declines in the latter three content areas. The average declines at the eighth grade level ranged from 2% standard deviation/year in language to nearly 5% standard deviation/year in social studies (48). By the tenth grade, average subtest declines reflected a 4.5% standard deviation per year decrease in reading, an over 6% standard deviation per year in math, a 4% standard deviation per year decline in language, a near 7% standard deviation per year decrease in science, and an over 6% standard deviation per year decline in social studies performance (47).

Table 2

Scholastic Achievement Measures

Instruments		Time Period	Grade(s)	Annual N	Areas	Trends % SD/YR		Bibliography Source Numbers
Stanford Achievement Test		1964-1973	1-4	6,000,000	National		+1.3	47, 48
			5-8				-3.7	
Metropolitan Achievement Test (MAT)		1970-1978	2-4	400,000	National		+0.6	47
			5-8				-2.8	
			9-10				-5.3	
California Achievement Test (CAT)		1970-1978	2	Not Available	National	"Slight Gain"		47
			5/8			Rdg	-0.3	
						Mth	-0.4	
			11			Rdg	-2.0	
						Mth	-3.5	
Iowa Tests of Basic Skills (ITBS)		1965-1980	3-4	50,000	Iowa	Rdg	+1.1	157, 119
						Mth	+0.2	
						Comp	+1.0	
			5-8			Rdg	-2.0	
						Mth	-2.9	
						Comp	-1.4	
Comprehensive Tests of Basic Skills (CTBS)		1968-1973	2-4	200,000	National	Comp	-0.1	103
			5-8			Comp	-1.2	
			9-10			Comp.	-3.0	
Iowa Tests of Educational Development (ITED)		1965-1980	9-10	Not Available	Iowa	Voc	-0.4	177
						Quan	-1.2	
						Comp	-1.6	
			11-12			Voc	-0.9	
						Quan	-1.2	
						Comp	-1.5	
National Assessment of Educational Progress (NAEP)	Rdg	1971-1980	4	75,000 to 100,000	National	Rdg	+.06	53, 91, 115,
						Wri	-0	163, 164, 165
	Wri	1969-1974				Mth	-0.7	166, 167, 168,
						Sci	-0.9	235
	Mth	1973-1978	8			Rdg	+0.1	
						Wri	-1.2	
	Sci	1970-1979				Mth	-0.8	
						Sci	-1.1	
			12			Rdg	-0.1	
						Wri	-1.3	
						Mth	-1.4	
						Sci	-2.9	
Canadian Tests of Basic Skills		1966-1973	3	Not Available	Canada	Comp	-0.6	157
			8			Comp	-1.0	
Iowa Silent Reading Tests[1] (ISRT)		1944/1976	6	15,000/8,000	Indiana		+1.8	79
			10	11,000/8,000			+0.8	
General Educational Development (GED)		1964-1979	Mean 10	120,000 to 700,000	National	-0.86 % Met Stds/Yr (73% Vs. 60.1%)		92

[1] ISRT scores adjusted for examinee age changes between testing sessions.



*Mean proportion of a standard deviation per year.

Figure 3 — Achievement Measures

California Achievement Test (CAT)

Reviewed data on the CAT are relatively sparse. The CAT pattern is very similar to Stanford and MAT patterns with slight reading and math increases over the 1970-78 period at the 2nd grade level, slight decreases at grade 5, and accelerating decreases through the 11th grade averaging 2 to 4% per year of a standard deviation.

Iowa Tests of Basic Skills (ITBS)

The ITBS battery yields grade 3-8 achievement scores in five major areas (vocabulary, reading, language skills, work-study skills, and mathematics skills) plus a composite score. As documented by Munday (157), ITBS scores on all six scales at all six grade levels increased consistently from 1955-1965. During the 1965-1980 period, scores stabilized for 3rd and 4th graders on all but capitalization and punctuation subscales of the language skills test, which declined rather dramatically over the latter period. For the 5th through 8th grades, average scores declined at an increasing rate with each school year, particularly in the vocabulary, reading, and language skills areas. The ITBS trend for 5th through 8th graders on the percent standard deviation per year scale was about 2% decline per year in reading achievement and a 3% decline per year in math. Thus, ITBS data reflect very similar results to the earlier discussed achievement tests.

Canadian Tests of Basic Skills

The Canadian Tests of Basic Skills are similar to the ITBS and are widely used for Canadian elementary school children. 1966-1973 score trend analysis showed:

> Differences on the composite range from 1.5 grade equivalent months in grade 3 to 6.1 grade equivalent (months) in grade 8. Differences were greatest in the four tests of language skills, capitalization in particular . . . . (157)

Comprehensive Tests of Basic Skills (CTBS)

The CTBS battery tests children from 2nd through 10th grades, yielding scores on mathematic application, concepts, and computation; reading, vocabulary, and comprehension; language mechanics, spelling, and expression, and reference skills. Comparison of 1968 and 1973 norming data show practically unchanged performance on all three major content areas through 5th or 5th grades and worsening performance through 10th grade at an incrementally widening rate. By the 10th grade, the average 1973 composite score was 35 scale score points lower on a scale ranging from 250 at 2nd grade to 620 at 10th grade (103).

Iowa Tests of Educational Development (ITED)

The ITED battery tests high school students in seven achievement areas: Expression, Quantitative Thinking, Social Studies, Natural Sciences, Literature,

Vocabulary, and Use of Sources. Performance patterns are similar to SAT and ACT trends. In general, average performance across all subtests increased through the mid-1960s and has decreased since, most profoundly in the literature and quantitative scales for the 12th grade. Natural Science scores appear to have stabilized around 1971 at all four grades, and remained fairly constant (177).

National Assessment of Educational Progress (NAEP)

The NAEP is a federally-funded project designed to measure national scholastic achievement across time at the 9, 13, 17 and young adult (26-35) ages. Starting in 1969, assessments have been made in 10 curricular areas which have been repeated in four year cycles. The tested areas are: art, career and occupational development, citizenship, literature, mathematics, music, reading, science, social studies, and writing. As Table 2 shows, the general pattern reflected in the applicable NAEP subtests is similar to those reflected in the commerically-produced scholastic achievement measures, except on the reading scale, where little change occurred from 1971 to 1980. Harnischfeger and Wiley (53) suggest that the NAEP reading scale contradiction with other verbally-related scales is a function of the NAEP test contents and tasks. They report that:

> NAEP's items address basics far below the 11th and 12th grade curricula, while the other tests are oriented towards more grade-level specific content. . . . The NAEP increase . . . may not ultimately contradict the findings of decline in more complex content (53).

As shown in Table 2, the math, science, and writing subtests of the NAEP have produced results very similar to other measures reported, with accelerating decreasing performance with educational level.

General Educational Development (GED)

The GED is an achievement battery used to determine qualification for an examinee to be issued a credential "equivalent" to a high school diploma. The battery is produced by the GED Testing Service of the American Council on Education. It is composed of five subtests: The writing skills test, the social studies test, the science test, the reading skills test, and the mathematics test. GED data across the 1952-1979 time period have been reported (92) by percent of examinees meeting standards for the credential. It should be noted that the population of examinees has changed rather drastically over the period: total number tested increased from about 30,000 in 1952 to 774,000 in 1979; the average age of examinees has declined from near 30 years old in the late 1950s to around 25 in the late 1970s; and the proportion of veterans to non-veterans has gone from .6 in 1953 to less than .3 by 1966. While accepting the impact of the changing demographics of the testing population, an analysis of the pattern of successful GED applicants is of direct relevance to the present study. In 1954; 80% of GED examinees met minimum standards. The proportion passing declined very slowly through 1962 (75%), but has dropped to under 60% for 1978-1979.

Iowa Silent Reading Tests (ISRT).

One final large scale study was reviewed. In 1976 Roger Farr and his associates (71, 72, and 73) at Indiana replicated two 1944-45 statewide reading achievement tests for 6th and 10th graders. The researchers found relatively small decreases in performance over the 32 year period, however the 1944 year-group was approximately 10 months younger for 6th graders and 14 months younger for 10th graders. Farr adjusted his test score data to reflect the age differences and concluded that "the assumption that the reading abilities of students is declining is unsupported by this study" (79). It should be noted that Farr's study compared only two data points in time, 1944 and 1976, and thus is not comparable with the great majority of the other studies in this review which generally cover the later 1960s and 1970s. It is well documented that test scores in general rose until the mid 1960s when the decline began to be extensively reported. Although pure conjecture, it is very possible that if data comparable to Farr's were available for the mid-1960s, that mean scores might have been considerably above the 1976 scores. Presumably this conjecture will never be either supported or rejected.

Summary of Achievement Testing Trends

In general, the author found consistent evidence of achievement test score declines, in all areas tested above grade 4, for the 1960s through 1970s. Pre-school academic preparation and early (1st-3rd grade) children generally scored higher on all measures, with 4th grade students fairly constant. In the author's opinion, these trends are real, national in scope, and continuing, though at a decreasing rate of decline since about 1977.

Other Indicators of Population Performance Change

The literature on the test score declines includes many references to other indicators of a national declining level of competence of youth beyond simply test performance. Among others, these indicators include elementary, high school, and college teachers' opinions, statewide competency-based assessment, measures of curricula content at all levels, analyses of classroom hours attendance per student, analyses of teacher education and practices, and physiological hypotheses about diet, drug, medication, nuclear radiation and other possible correlates of declining test scores. The annotated and full bibliographies of this review cite these and other reports and studies. It is beyond the scope of this review to attempt to analyze the probable (possible) causes of the declining scores.

SUMMARY OF OVERALL TESTING TRENDS

It is evident that national youth performance on scholastic aptitude and achievement tests have been in a state of decline. Assuming comparability of population, for current military enlistment eligible youth (17-24), the scope of the decline based upon this literature review of civilian test score change would likely represent a general decrease of about one-fourth to one-third of a standard deviation on the average from the 1970 pool of AFQT examinees, or about 2-3% of a standard deviation per year. This rate would equate to a decline of approximately 4-5 AFQT raw score points for the average Military Enlisted Accession from 1971 to 1980.

Section II

ANNOTATED SELECTED BIBLIOGRAPHY

SECTION II: ANNOTATED SELECTED BIBLIOGRAPHY[1]

5. Advisory Panel on Scholastic Aptitude Test Score Decline, *On Further Examination*, 1977.

This report, known popularly as the Wirtz report after Willard Wirtz, the advisory panel chairman, covers an extensive review sponsored by the College Entrance Examination Board (CEEB) to investigate the SAT decline. The blue-ribbon panel of 21 authorities was formed in late 1975 and the report was published in July, 1977 as a separate CEEB publication as well as testimony to the 1979 Examination of Basic Skills conducted by the Sub-committee on Education, Arts, and Humanities of the Committee on Labor and Human Resources of the U.S. Senate (#73).

The Wirtz report is an excellent, well thought out treatise on the SAT decline. Besides the basic document, CEEB has published 27 appendices which represent individual studies and reports on related topics commissioned specifically by the panel. The 27 appendices are abstracted in an annotated bibliography to the main report and were published as a separate CEEB publication.

The report itself is divided into the following sections:

Part One: The Scholastic Aptitude Test and the Test Score Decline.
Part Two: An Unchanging Standard.
Part Three: The Two Test Score Declines.
Part Four: Circumstantial Evidence.
Part Five: Summing Up.
Annotated List of Studies and Papers.
Bibliography.

* # 16. Arnold, C.B., *Could There Be a Medical Basis for the Declining SAT Scores?* January 1977.

A brief summary and analysis of the medical and epidemological literature dealing with nutrition, drugs, genetic and prenatal conditions, labor and delivery, child development, health status, and health care over several decades in the United States. It concludes that the decline in SAT scores is probably not the result of disease processes or physical environmental factors.

[1] Asterisked entries in this annotated bibliography indicate quoted citations from the following sources:

*From Source #5.
**From Original Authors' abstracts.
***From *Educational Technology*, November 1979

*** # 20. Baird, L., & Fiester, W., *Grading Standards: The Relation of Changes in Average Student Ability to the Average Grades* Awarded (ED 054 226, 1977), concerns trends in faculty grading practices.

Authors Baird and Fiester studied the means and standard deviations of freshmer classes on an ability test, along with the means and standard deviations of freshman-year grades over a five-year period, which were available from several hundred colleges.

Based on analyses of the data, they observe:

(1) Within any given year colleges whose incoming students were bright tended to award higher grades, but there was considerable room for variance from this trend.

(2) The average ability levels of colleges change very little, even over five periods, [and]

(3) When the average ability of students increases (or decreases) about the same levels of grades are awarded.

The paper discusses implications of the observed grading practices for college admissions and counseling, and raises questions about the quality of students' work vs. aptitude and student attitudes toward the competitive grading system. The authors conclude:

> In sum, the present results provide little evidence that faculties will adjust grades to correspond to changes in average student ability over some time lapse, . . . [that] permanent or absolute standards are employed in evaluation or that faculty generally take the changing ability level of their student bodies into account . . . We need to devote as much attention to faculty grade giving behavior as we have to student grade getting behavior.

* # 23. Beaton, A.E., Hilton, T.L., & Schrader, W.B. *Changes in the Verbal Abilities of High School Seniors, College Entrants, and SAT Candidates Between 1960 and 1972.* January 1977.

Two major social science research efforts — Project Talent in 1960 and the National Longitudinal Study in 1972 — obtained extensive data on ability and other significant characteristics for national probability samples of high school seniors. Both surveys made follow-up studies to determine which of these seniors had entered college in the year following high school graduation. This study was designed to use these two exceptional data bases to document changes between 1960 and 1972 for high school seniors, college entrants, and the SAT-taking population. The data of the national surveys were supplemented by the results of a special equating study and by a search of SAT files for about 20,000 members of the Talent sample.

The study was concerned with three groups — high school seniors, college entrants, and SAT takers. Because reading scores were available for all three groups, it was possible (after equating the reading tests used) to measure changes in reading ability for all three groups. In addition,

it was possible to study subgroups of the three main groups. The subgroups were defined on the basis of each of the following characteristics: age, sex, father's education, mother's education, father's occupation, mother's occupation, family configuration, high school curriculum, and expected college major field.

The main conclusions of the study are as follows.

1. All three groups showed a decline in reading ability between 1960 and 1972. The decline of SAT takers, however, is markedly greater than for the other two groups.
2. A much greater increase in the proportion of low-ability than of high-ability students who took the SAT appears to be the predominant source of the SAT score decline between 1960 and 1972. The decrease in ability level of high school seniors during this period also contributed to the decline.
3. There is some evidence that SAT scores earned in 1960 and 1972 are not precisely comparable. The data suggest that the actual decline in average verbal ability of SAT candidates from 1960 to 1972 was somewhat greater than the SAT scores indicate.
4. There were appreciable changes in the background characteristics studied for all three groups. None of them made a major contribution to accounting for the score decline among high school seniors or college entrants. A decrease in the percentage of SAT takers entering four-year colleges may help to explain the greater score decline observed for this group.

* # 30. Braswell, J. & Petersen, N., *An Investigation of Item Obsolescence in the Scholastic Aptitude Test.* October 1976 (revised January 1977).

Two panels, one concentrating on the verbal sections of the SAT and the other on mathematical, were appointed to review and rate questions that appeared in earlier editions of the test and then in more recent editions. Raters were asked to indicate how the difficulty of each question might be expected to change between the two administration dates. The raters' predictions were then compared with available item analysis data. For the most part, the changes predicted by raters were not substantiated by the statistical analysis. While the relative difficulty of some questions changed between administration dates, it was not possible, except for a few mathematical questions, to attribute these changes to curricular change or to broader social factors. These mathematical questions were predicted by the raters to be relatively easier at the more recent administration, and their prediction was supported by the statistical analysis.

The Test Score Decline, Parts One and Two, in two successive issues of *Educational Technology*. June and July 1976.

These two issues of *Educational Technology* brought together 15 articles on selected aspects of declining test scores. The articles and their authors follow:

Part One

#106. Harnischfeger, A., & Wiley, D., The Marrow of Achievement Test Score Declines.

#107. Harris, W., The SAT Score Decline: Facts, Figures and Emotions.

82. Ferguson, R., The Decline in ACT Test Scores: What Does It Mean?

86. Forbes, R., Assessing Educational Attainments.

#193. Rippey, R., The Test Score Decline: If You Don't Know Where You're Going, How Do You Expect to Get There?

36. Burns, R., Minorities, Instructional Objectives and the SAT.

#239. Walberg, H., Changing IQ and Family Context.

#198. Sapone, C.V., & Giuliano, J.R., The Test Score Decline: Are the Public Schools the Scapegoat?

Part Two

#129. Kapfer, P., Kapfer, M., & Woodruff, A., Declining Test Scores: Interpretations, Issues and Relationship to Life-Based Education.

80. Feldhusen, J., Hynes, K., & Ames, C., Is a Lack of Instructional Validity Contributing to the Decline of Achievement Test Scores?

#237. Throne, J.M., Has the Key to the Mystery of Drops in Standardized Test Scores Been Discovered?

40. Champagne, D., & Roberts, E., An Exercise in Freedom: A Place Where Test Scores Appear to Be Rising.

3. Acland, H., If Reading Scores Are Irrelevant, Do We Have Anything Better?

56. Della-Piana, G., Odell, L., Cooper, C., & Endo, G., The Writing Skills Decline: So What?

The 15 articles present a picture of various lines of thought on the test score declines, though as a group there are little data provided. Many of the same authors have better documented publications outside of the two-issue *Educational Technology* series.

32. Breland, H.M., *Family Configuration Effects and the Decline in College Admissions Test Scores: A Review of the Zajonc Hypothesis.* September 1976 (revised February 1977).

A hypothesis that part of the SAT score decline is a result of changing American family sizes and configuration is explored. This possible explanation of declining SAT scores had been offered by Robert B. Zajonc in an article in *Science* that reviewed the evidence for a relation between family configuration and cognitive development. Since a number of investigations have shown that "early-born" students — those who were the first or second child in their families — and members of small families tend to have higher scores on tests such as the SAT, a change in the representation of students who are earlyborn and members of small families in the population could possibly cause a decline in the average for the total population. The hypothesis is explored through a consideration of the magnitude of the change in family configurations over the years of interest and the magnitude of observed score differences for the SAT. It is concluded that, while the Zajonc hypothesis seems sound, it could only account for a small portion of the total SAT score decline.

* # 33. Breland, H.M., *The SAT Score Decline: A Summary of Related Research.* January 1976.

This paper surveys the available evidence pertaining to the score decline in terms of five hypothesis areas: the test, the test-taking population, the college-bound population, the schools, and societal factors. It contains a description of the SAT score decline in both graphic and tabular form as well as population data for the years 1957 through 1973. Based on the data available at the time the panel began its deliberations, it is concluded that the evidence confirms a general decline in the abilities of the college-bound population but is less clear with respect to the high school population. It is speculated that the declines in the college-bound population are due to several factors acting in combination: increases in the proportion of low- and middle-income students, reductions in the numbers of test repeaters, changes in the mix of SAT-user colleges, and less-strict policies regarding college admissions.

* # 39. Chall, J.S., with Conard, S.S., and Harris, S.H. *An Analysis of Textbooks in Relation to Declining SAT Scores.* November 1976 (revised March 1977).

The authors analyzed the reading selections from six SATs, two from the stable years (1947 and 1955), one from a pivotal year (1962), and three from the declining years 1967, 1972, 1975). Samples of the textbooks used most widely by these six SAT cohorts during their elementary and high school years were analyzed — 35 textbooks and approximately 20 workbooks and teacher's guidebooks in reading, grammar and composition, literature, and history for grades 1, 6, and 11.

The various textbooks and SAT reading passages were analyzed using various indices of difficulty and challenge the Dale-Chall Readability Formula for level of reading/comprehension difficulty, Chall's Reading Stages for level of linguistic and cognitive maturity, a rating scale for assessing question difficulty adapted from Bloom's Taxonomy, etc.

1. Readability analyses of the SAT passages reveals a general decreasing trend in difficulty from the two stable years (1947 and 1955) through the pivotal year (1962), to the declining years (1967, 1972, and 1975).
2. A possible gap between the difficulty of the SAT passages and the difficulty of the 11th-grade textbooks is indicated. The SAT passages proved to be the most difficult of any of the materials analyzed — more difficult than any of the textbooks. Two of the SAT passages were on the level of grades 13-15 and four on the level of grades 11-12. The history, literature, and grammar and composition 11th-grade textbooks had an average readability level of grades 9-10.
3. There are signs in the data of a recent increasing challenge in the textbooks, particularly at the elementary level.
4. The authors find what appears to be a particularly low level of challenge in writing. Generally the assignments in reading, history, and literature textbooks ask mostly for underlining, circling, and filling in of single words. Few assignments ask students to write a paragraph, story, letter, or theme.

* # 42. Cleary, T.A., and McCandless, S.A. *Summary of Score Changes* (in Other Tests). February 1, 1977. An excerpt from the authors' "Score Declines and Grade Inflation," a paper delivered at the annual meeting of the Northwest Association of Schools and Colleges, Portland, Oregon, December 1976.

Summarizes the experience of other testing programs, indicating the degrees to which average scores in each changed over the period of the SAT score decline.

* # 58. Donlon, T., and Echternacht, G. *A Feasibility Study of the SAT Performance of High-Ability Students from 1960 to 1974 (Valedictorian Study).* October 1976 (revised February 1977).

This is a study of the SAT records of valedictorians and salutatorians in three groups of schools: "experimental" schools, selected for stability but by less stringent criteria; and "private" schools. For each group SAT-V and SAT-M scores in the even-numbered years from 1960 to 1974 were studied.

For the "experimental" group, there is no evidence of score decline in either SAT-V or M. Instead the trends have been toward very modest annual increases. For the "comparison" group the data indicated an initial period of increase, followed by a decrease. Each of these two

special samples differed significantly from the SAT-taking population. The "private" schools, however, were not significantly different, showing a decline similar to the total College Board population.

60. Ebel, R., Declining Scores: A Conservative Explanation, *Phi Delta Kappan*, December 1976.

Ebel questions the "Rousseauean philosophy" which has taken over education in recent decades. He calls for a "back to basics," and asks what the mission of schools is. He concludes by defending the content of testing and calling for better instruction in the cognitive areas tapped by the tests. No data—article is essentially a logical argument.

* # 62. Echternacht, G. *A Comparative Study of Secondary Schools with Different Score Patterns.* October 1976 (revised January 1977).

In this study, the curriculum, institutional, teacher, and student factors associated with those schools having large decreases in SAT score averages were compared with the same factors associated with schools having increasing or steady SAT score averages. It was believed that by identifying these factors, some insight into the role that school characteristics have played in the score decline might come to light. Although some significant differences between the two groups were found in terms of enrollments in academic courses, ability grouping, age of schools, dropout rate, and teacher experience, these were judged not to explain a large portion of the decline. Indeed, differences among schools do not appear to have had large differential effects on the decline of scores.

** # 67. Education Commission of the States, *Reading in America: A Perspective on Two Assessments.* October 1976.

The report presents data on changes in social studies achievement for young Americans aged 9, 13, and 17 during the periods 1972-76. Data were collected through two surveys conducted by the National Assessment of Educational Progress during the 1971-72 and 1975-76 school years.

Test items were categorized in three major areas: knowledge, skills, and attitudes. Four topics included under knowledge were economics, geography, history, and politics. Skill items dealt with ability to obtain and interpret information; questions about attitudes covered support for constitutional rights and respect for others. In this report, the first three chapters describe results for the three major areas. Each chapter includes a summary of changes in national performance, samples of the items used, and data for various population groups. Chapter four compares achievement for 13 and 17 year-olds. Overall results of the assessment revealed that 9 year-olds showed no statistically significant change in performance, and that 13 and 17 year-olds' performance declined. Seventeen year-old Hispanic students

and students living in the West displayed smaller declines than the nation as a whole. Although overall performance of blacks remained below that of whites, at age 9 blacks showed more improvement than whites. At age 13 black performance remained the same while white performance declined.

69. Elam, S., The Nuclear Reaction/SAT Decline Connection, *Phi Delta Kappan*, November 1979.

This article relays an interview between Elam and Ernest Sternglass. Sternglass traces SAT declines by geographical area and relates fallout to SAT declines in each area across different periods. Sternglass' original paper on this subject was presented at APA in 1979 and is cited as #220 in the bibliography of this review.

72. Eurich, A., The Reading Abilities of College Students—Fifty Years Later, *Academy News*, May 1980.

In 1978, Eurich replicated, at the University of Minnesota, a study he conducted in 1928 on reading tests he developed. He then compared results over the 50 year interim period. His results showed significantly poorer performance for the 1978 group on vocabulary, reading comprehension, and reading rate. He also concluded that 1978 freshmen were at least one grade level below the 1928 students.

Study is methodologically weak both in terms of testing devices used and lack of control for extraneous variables.

73. *Examination of Basic Skills Achievement Designed to Assist Both States and Local School Districts to Expand and Improve Their Programs in Basic Skills in the Elementary and Secondary Grades.* 1979.

Twelve hundred page testimony including *numerous* documents submitted for the record on basic skills. Marvelous resource document which includes testimony by Copperman, Flesch, Howe, Wirtz, Graham (of NIE), Chall, Farr, and Wood (Massachusetts DOE), among others.

77. Farr, R., & Olshavsky, J., Is minimum competency testing the appropriate solution to the SAT decline? *Phi Delta Kappan*. April 1980.

The authors answer no to the question they ask in the title to this article. They point out that the SAT decline does not reflect basic competencies and thus it is inappropriate to prescribe minimum competency testing as a cure for falling SAT scores. They also point out that "there is no evidence of widespread lack of basic literacy for (high school upper-classmen)." They emphasize that the NAEP results support this point-of-view in the areas of basic literacy skills and practical verbal tasks. They conclude by stating that basic literacy is "already at a very high level," and that

> If a state or school system wants to improve literacy levels, it does not seem that greater emphasis is

needed on lower level reading achievement. What is needed is increased emphasis on higher level reading/thinking skills.

*** # 83. Ferguson, R., & Maxey, J., Trends in the academic performance of high school and college students (ED 109 523), 1975.

(This study) examines the high school averages, ACT test scores, and first college semester grade point averages of high school students who entered the ACT Assessment Program in 1964-65. The authors . . . found that over an eight-year period, grades awarded by high school and college faculty showed a significant increase while, at the same time, ACT test scores were on the decline. While noting a number of possible explanations for this phenomenon, they believe . . . the rise in grade point averages, both at the high school and college level (is due) to an increased leniency in the evaluation of student performance, that is, to a lowering of the academic standards, arbitrary as they were, of past years. At the same time, it is (the authors) judgement that the decline in ACT scores is the result of a significant shift in the developed academic abilities of the population of students applying and being admitted to college.

The authors offer several recommendations for policies and practices in postsecondary institutions in light of their findings.

* # 87. Ford, S., & Campos, S., Summary of validity data from the Admissions Testing Program Validity Study Service, June 1977.

Validity data (prediction of first-year grade-point average) for colleges participating in the Admissions Testing Program Validity Study Service (VSS) and based on students entering college in 1964 through 1974 are summarized for the following predictors: SAT-Verbal score, SAT-Mathematical score, high school record, and these three predictors combined.

No definite trends over time are apparent for SAT validities, although those obtained for 1973 and 1974 were generally among the highest observed. There was a downward trend in multiple correlations for all three predictors combined. Median validities for colleges having SAT-V means between 450 and 549 tended to be higher than those for colleges below 450 or above 550. The great majority of colleges participating in the VSS were found to be four year colleges. Separate analyses of the small number of two year colleges in the sample yielded slightly lower median validities for each of the predictors than those found for the total sample.

92. *The GED Statistical Report, 1979.*

Statistical data on 1952-1979 GED testing. Table 3, Comparative Testing Data, 1952-79, tracks percentage meeting GED minimum passing standards. Data show consistent decline over the period, although populations changed through more and younger examinees. Average years of education consistent through period.

* # 94a. Glover, R., Major societal changes in U.S. (1933-44 and 1945-75): Contextual mapping, April 1976 (revised August 1976).

For a span of 42 years (1933-75) a fold-out chart displays major events and influences on events, products, and other phenomena, suggesting their interconnectedness in graphic form. The presentation covers occurrences in the following areas: political, social and cultural, economic and financial, legislative and legal, population and human ecology, and knowledge and technology. The August 1976 revision is accompanied by a scenario for the period 1976-1985.

#103 Harnischfeger, A., & Wiley, D., *Achievement Test Score Decline: Do We Need to Worry?* 1976.

An outstanding early source on the declining test scores. Study is well written and well-documented with loads of data. Should be a prime source for any study of subject. Authors document reality of decline and consider the social and educational context of achievement test score declines. They evaluated most of the hypotheses for the causes of the declines and recommended research studies where data were lacking. A classic reference.

#105. Harnischfeger, A., & Wiley, D., *Achievement Test Scores Drop. So What?* March 1976.

Primarily an excerpt from the earlier monograph, this article summarizes the various test trends and discusses causes underlying the trends. A good short article, although the full monograph has much more information in it.

#110. Hess, F., Martin, W., Parker, D., & Beck, J., An Examination of Trends in Performance on ACT and SAT Examinations, 1978.

Outstanding source on subject, relatively short, though concise discussion of declines and potential causes. Some attempts to quantify percent of decline to various causes. Perhaps the best source for a quick, authoritative discussion of the subject.

** #111. Higgins, J., et al., *Assessing Mathematical Achievement*, December 1979.

This report was compiled to serve as a reference on assessments of achievement in pre-college mathematics. Patterns of mathematical assessments are discussed in terms of the history and nature of assessments of achievement, the relationship between assessment and minimum competency testing, and the current status of state assessment progress. Trends in mathematics achievement are examined by presentation of portions of reports of the National Assessment of Educational Progress and the California Assessment, grades six and twelve. Conclusions drawn from examination of these assessment data include: (1) Although schools have been successful in teaching whole number computation, they have been only moderately successful

with decimals are even less successful in teaching computation with fractions: (2) Students who know "how" to compute frequently do not know "when" or "where" to compute: (3) Schools must broaden their view of basic arithmetic if they expect students to use what they are taught. An extensive list of references is included.

#114. Hodkinson, H., What's Right with Education, *Phi Delta Kappan*, November 1979.

Former head of NIE argues that things aren't really so bad with education. Provides comparison data on international achievement in mathematics, science, and reading and also graduate admission test data from the 1977 *Conditions of Education*. Author's bias shows through.

** #115. Holmes, B., & Wright, D., *What Do Young Adults Know About Science? Some Results From Two National Assessments.*, February 1980.

Data for this report come from the National Assessment of Educational Progress (NAEP), gathered in three science assessments of 9-, 13-, and 17-year-olds, and young adults. The assessments were conducted in 1969-70, 1972-73, and 1976-77. This paper focuses on changes in science knowledge of young adults from the second assessment to the third assessment and compares performance of young adults with that of 17-year-olds. Results report a uniform decline in scientific literacy among young adults and 17-year-olds, with no difference between the two groups in their performance on science exercises. Observations are also noted regarding patterns of responses as to gender, minority groups, and social factors.

* #120. Jackson, R., *Comparison of SAT Score Trends in Selected Schools Judged to Have Traditional or Experimental Orientations.* October 1976.

A group of schools consisting largely of highly regarded schools in affluent suburban areas was divided into two groups--those judged to have a traditional orientation and those judged to have a more experimental orientation (in terms of course and program structure). A review of the mean SAT scores of SAT candidates from the 1966, 1969, 1973, and 1976 graduating classes from these schools shows that (a) mean SAT scores for both school groups were substantially higher than national averages, and (b) declines in mean SAT scores for both groups over the period studied very nearly paralleled the national declines.

This was a small-scale pilot test using available data. Because of the relatively fallible procedures used for classifying schools and because of a general lack of experimental controls of the effects of extraneous factors, the results cannot support any general conclusions about the possible relation of experimentation in the schools to score decline. Because of the essentially negative findings of this pilot test, a more substantial study of this group of schools was not attempted.

* #121. Jackson, R., *Correlations of SAT Scores with High School Record.* January 1977.

Two sets of data are examined: (a) correlations of SAT scores with student reports of class standing (collected by means of the student Descriptive Questionnaire) for 1971-72 through 1975-76, and (b) correlations of SAT scores with measures of high school performance for groups of students attending colleges participating in the College Board Validity Study Service, for entering classes from 1964 through 1974. The correlations of SAT scores with self-reported class rank are virtually level over the five years studied. The longer-term comparisons using validity study data suggest that the median correlations of SAT verbal or mathematical scores with high school record may have increased somewhat over the 11 years studied.

* #122. Jackson, R., *An Examination of Declining Numbers of High-Scoring SAT Candidates.* January 1977.

The sharp declines in numbers of SAT candidates scoring over 600, which were observed from 1969-70 through 1974-75, are examined. Several suggested explanations of this phenomenon relating to test-taking patterns are discussed. Specifically examined are the possibilities that less SAT-to-SAT repetition, or less PSAT-to-SAT repetition, or less overlap between SAT and ACT among high-scoring students might account for some part of the observed declines. Although ideal data for testing all these explanations were not available, certain data in hand suggest that, while changes in test-taking patterns may have had some effect, they probably cannot entirely explain the trend in question.

* #123. Jackson, R., *Mean Scores for PSAT and PSAT/NMSQT Junior Candidates.* December 20, 1976.

Gives the numbers of students taking the preliminary Scholastic Aptitude Test and the Preliminary Scholastic Aptitude Test/National Merit Scholarship Qualifying Test and their mean scores for the period 1959 through 1976. The implications of these results in relation to changes in the candidate group are discussed.

* #124. Jackson, R., *A Summary of SAT Score Statistics for College Board Candidates.* December 1975 (revised October 1976).

Summaries of SAT score statistics for test candidates are presented for students grouped according to testing years (for 1956-57 to 1975-76) and for students grouped according to high school classes (from 1966-67 to 1975-76). For recent years, mean scores for geographical regions and for students grouped according to select responses to the Student Descriptive Questionnaire are also presented.

* #125. Jackson, R., *Trends in Mean SAT Scores for Students from the High School Classes of 1971-72 and 1975-76 Belonging to Selected School and College Groups.* January 1977.

Data are presented on trends in SAT performance from the year 1971-72 to 1975-76 for students who (a) attended certain selected high schools for which group summary reports had been produced through the College Board summary report service, or (b) had their scores reported to colleges in groups similarly formed for summary reporting purposes. All school and college groups for which reports were produced both in 1971-72 and 1975-76 are included. The great majority of these groups exhibited declines in mean SAT scores over this period. With only a few exceptions, those groups showing increases in either SAT-verbal or SAT-mathematical mean scores had substantially smaller numbers of students in the more recent years.

*** #147. Mayville, W., *The Trouble With Grading Is . . .*

This study will consider how grading systems evolved in this country and how this evolution relates to the changing meaning of grades to the student, the teacher, professional and graduate schools, and society.

The paper includes sections on: Historical Variations of Grading Formats, Grading Options and Uses of Grades, and Measuring Student Achievement. The author surveys the various explanations for "grade inflation"—from leniency of grading during the Vietnam War to prevent male students from being drafted, to the adoption of pass-fail options. But whatever the contributing factors, "grade inflation seems to carry with it the accumulated frustration, both articulated and suppressed, of students and their teachers over what constitutes a valid statement of student achievement in any particular course."

The author contends that a systematic assessment of the grading situation is essential, and concludes:

> The belief that learning is independent of evaluation has profound consequences and could be the idea around which future grading systems will evolve . . . The diverse diverse student populations who are in the process of being educated are in danger of being poorly served in their desire for a higher education.

*** #148. Melican, G., & Feldt, L., An Empirical Study of the Zajonc-Markus Hypothesis for Achievement Test Score Decline, *AERJ.* Spring 1980.

Zajonc has proposed that the decline in high school achievement since 1965 can be explained by the trend from 1947 to 1962 toward larger, closer-spaced families. This deduction is based on the Zajonc-Markus theory relating child spacing to intellectual development. The present study tested this theory with data on students in Iowa high schools.

* #151. Modu, C., & Stern, J., *The Stability of the SAT-Verbal Score Scale.* September 1976.

This study was designed to assess the stability of the score scale between 1963 and 1973 for the verbal sections of the SAT. In a previous study, scores on two old forms were equated to a 1973 form and, through that form, to the College Board scale by means of sets of items common to the new and old forms. This earlier study suggested that the SAT scale had shifted upward by an average of 14 points on the verbal sections and 17 points on the mathematical sections.

In the present study, pairs of 1963 and 1973 forms of the SAT-V were administered in counterbalanced order to spaced samples of the same group, with each candidate taking a 1963 and a 1973 form. The obtained scores were used to place the 1973 scores on the reporting scale used for the 1963 form. The experimentally derived scores on the 1963 scale were then compared with their corresponding scores on the 1973 scale for candidates of the same ability levels in order to estimate the degree of scale shift.

The findings of the present study confirm an upward scale drift which gave the 1973 candidate group an average of 8 to 10 points higher than they would have earned had these experimental equating results rather than the operational equating results been used in reporting the 1973 scores. The scale drift observed for the present study was not uniform over the extent of the scale; it was found to increase as scores decreased from 600 to 200. Little scale drift was noticed over the 10-year span for scores of 650 and above. Based on the evidence from this study it would appear that the reported declines in mean SAT-Verbal scores from 1963 to 1973 are about 8 to 10 points smaller than they would have been had the scale been completely stable.

#156. Munday, L., *Changing Test Scores, Especially Since 1970,* March 1979.

An authority on testing offers some "uneasy generalizations": 1) Sharp declines beginning in the late 1960s have ended; 2) since 1970 there have been continued achievement gains in the lower grades; 3) since 1970 there has been a leveling off in the middle and upper grades with some small declines; 4) today's achievement levels compare favorably with available history; elementary children may be at a historical high point; and 5) today's high school achievement is about even with that of the early sixties. (Author's abstract).

This article has been rebutted by Copperman (43) and others as overly positive. Recent data seem to agree with Munday's critics. Article is well-written and documented and provides a good data source.

#157. Munday, L. *Declining Admission Test Scores.* 1976.

One of the best early sources on test score declines. Lots of data from numerous tests. Some, like the Canadian Tests of Basic Skills, only found in this source. Excellent analysis and well-supported conclusions. Should be included in all reviews of the subject area.

* #170. Nelson, J.E., *A Review of Data Available Regarding Family Income and Financial Aid Characteristics of Students.* October 1976.

Greatly expanded programs of financial aid based on need have made it possible for large numbers of low-income students to attend college. Since test scores have high correlation with family income, has the increase in low-income students taking the SAT produced the decline in mean scores? This review of available College Board candidate data, income distributions of entering freshmen, percentage of age groups in college by income levels, and impact of student aid on low-income enrollment shows an increased percentage of students coming from lower-income families before 1972, but no significant change since that time.

* #188. *Available Evidence on Public Attitudes Toward Education.* June 1976 (Draft).

Questions dealing with education asked by American survey organizations since 1936 are examined, and over 60 taken to illustrate (1) changes in public opinion since 1960 that might have altered students' evaluations of college going or academic excellence, and (2) changes prior to 1960 that might have affected the quality of preparation for college.

Tables summarize responses to the following broad groups of questions: satisfaction with public schools and personnel and with college and university personnel; adequacy of homework in the public schools, of time spent in school, of discipline in the public schools, of the public school curriculum, of treatment of students with differing ability; desirability of nationwide testing programs; and evaluation of the teaching profession.

It is found that there was a period of criticism of all levels of schooling during the late 1950s, increasing satisfaction with schools and colleges during the 1960s, and a renewed dissatisfaction that starts at the end of the sixties. It would probably be impossible to reconstruct opinion changes between 1950 and 1970 in sufficient detail to relate them to changes in SAT scores.

A catalog of survey questions dealing with education, other than the questions analyzed in the report, is appended.

—A supplement to Reed's paper, consisting of excerpts from the *Eighth Annual Survey of the Public's Attitudes Toward the Public Schools.* A project jointly conducted by The Gallup Poll and the Charles F. Kettering Foundation. Princeton, New Jersey: Public Opinion Surveys, Spring 1976.

A significant drop in the public's rating of the schools was recorded between 1974 and 1975, but this decline leveled off between 1975 and 1976. Adults perceive the following as the major problems of the local public schools: lack of discipline; integration, segreation, and busing; lack of proper financial support; poor curriculum; use of drugs; difficulty of getting "good" teachers; parents' lack of interest; size of school or classes or both; school board policies; pupils' lack of interest.

The public believes that the decline in national test scores in recent years means that the quality of education is declining; it would like more attention

paid to basic skills and to discipline in the schools in order to counteract the perceived decline of quality in the schools. It inclines, however, to place blame on parents rather than preponderantly on the schools.

*** #189. Rever, P., & Kojaku, L., *Access, Attrition, Test Scores and Grades of College Entrants and Persisters: 1965-1973*, (ED 109 264, 1975).

The study is based on two groups of students, one comprised of students who completed the ACT Assessment Program and subsequently enrolled in college, and the other comprised of all students in the first group who completed their first year of college (first-year persisters). Data collected show a decline in ACT test scores, an increase in the high school grades of college entrants, and the stability of test scores and increases in college grades of freshmen completing their first year of college.

#192. Rimland, B., & Larson, G., *The Manpower Quality Decline: An Ecological Perspective*. November 1980.

Outstanding source on non-traditional hypotheses causing the decline in test scores. Cites data on juvenile delinquency rates, crime, hyperkenesis, learning disability, radioactive fallout, drug intake, food additives, etc. and their relationship to incidence of test score declines. Excellent bibliography. Study requires prior approval from NPRDC to cite or quote document.

#194. Rogers, V., & Baron, J., Declining Scores: A Humanistic Explanation. *Phi Delta Kappan*, December 1976.

A response to Ebel's conservative view (#60). The authors believe that "verbal knowledge" as described by Ebel is too narrow a view of what education is or should be. They argue for a school experience as rich and rewarding for all children as the lives we hope they will lead in adulthood. (Abstract by authors).

* #195. Rosenthal, E., and Beaton, A.E., *Annotated Bibliography*. December 1, 1975 (revised April 28, 1976).

More than 30 reports and publications pertaining to national declines in abilities are cited, and most are annotated. The citations in this bibliography include evidence available at the time the panel began its work.

* #204. Schrader, W.B., *Distribution of SAT Scores to Colleges as an Indicator of Changes in the SAT Candidate Population*. September 1976.

This study identifies trends in the extent to which SAT candidates were applying to various groups of colleges in 1960-61, 1966-67, and 1973-74.

Colleges were grouped on the basis of: (1) the classification developed by the Carnegie Commission on Higher Education, (2) the test or tests they required applicants to take, and (3) state and region. Results provide pertinent data on two main topics: (a) widening access to higher education and (b) acceptance of either SAT or ACT scores for admissions by some colleges. Although the interpretation of the data is complicated, especially by the lack of knowledge about the relation between college choice and taking the SAT, the results offer some reason to believe that both these factors resulted in changes in test taking between 1966-67 and 1971-72 that could have contributed to the SAT score decline. They do not, however, provide a numerical estimate of the size of the effects.

* #206. Schramm, W., *Television and the Test Scores.* August 1976.

There is no conclusive evidence as yet that television has been a sufficient cause for decline in test scores, although it may be one of several elements in a complex causal system. The major studies show that television viewing, after the early school years, tends to be associated with lower-than-average achievement, although the relative extent to which viewing affects achievement or unsatisfactory achievement encourages children to take refuge in television is not fully understood. Television reduces reading time, social interaction time, and the opportunity to practice certain skills necessary to academic excellence. It tends to reduce the average level of intellectual stimulation available to a child after the age of 9 or so. The trend of the evidence is that television viewing patterns belong to a group of strong variables that interact with each other and with school (and, therefore, test) performance, probably with negative effect.

* #218. Stern, J., *Selected Percentiles for Scholastic Aptitude Test Scores (1966-1967 through 1975-76).* January 1977.

This table presents the ninetieth, seventy-fifth, fiftieth, twenty-fifth, and tenth percentile groupings for SAT Verbal and Mathematical scores reported in the 10-year period between 1966-67 and 1975-76. A testing year is defined as extending from September to August; data are collected without regard to level of preparation or the number of times an individual student was tested during the defined year.

* #219. Stern, J., *Table of SAT and Achievement Test Scores for Samples of Candidates Taking Achievement Tests 1966-67 to 1975-76.* January 1977.

The table provides the SAT and the Achievement Test means and standard deviations for samples of candidates taking each of the 15 Achievement Tests offered in the Admissions Testing Program battery during the period 1966-67 to 1975-76. The samples, drawn annually through 1971-72 and biennially thereafter, provide estimates of SAT means for each Achievement Test population.

* #245. Wharton, Y., *List of Hypotheses Advanced to Explain the SAT Score Decline.* December 3, 1975 (revised February 20, 1976).

A listing of hypotheses to explain the SAT score decline (advanced in letters to the College Board, to the Advisory Panel, in magazine articles, and in newspaper stories) is presented and categorized using a four-part classification scheme: changes in the schools, changes in society, changes in the population, and problems with the tests. The first major category (changes in the schools) is further broken down into hypotheses relating to curriculum, institutional policies, teachers, and students. The second major category (changes in society) lists hypotheses related to family, religion, civil rights, crisis of values, national priorities, economic, labor movement in education, and technological changes.

* #252. Winter, D.G., *Motivational Factors in the SAT Score Decline.* October 1976 (Draft).

The paper examines the research evidence and theory about three human social motives that could be expected to play some role in test performance and academic functioning: the motives for achievement, for affiliation, and for power. It also considers the possibility of a "motivational overload." Broad cultural trends (i.e., post-Sputnik emphasis on academic achievement, revolt of the counterculture, crisis of values in Vietnam and Watergate) and related specific changes in the educational system ("open," "alternative," and "humanistic" education) may have had direct and indirect effects on motives. Some of the hypotheses suggest that actual motive levels went up or down with corresponding effects on academic performance. Others suggest the ways in which social forces may have changed beliefs about the nature and value of academic work, beliefs that may interact with relatively constant motive levels to produce behavior changes.

Section III

BIBLIOGRAPHY

SECTION III: BIBLIOGRAPHY

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